

CARBIDE AND CARBON CHEMICALS COMPANY

A DIVISION OF UNION CARBIDE AND CARBON CORPORATION

UCC

POST OFFICE BOX # Y
OAK RIDGE, TENN.

March 14, 1955

~~RESTRICTED DATA~~
This document contains restricted data as defined in the Atomic Energy Act of 1954. Its transmission or disclosure to unauthorized persons is prohibited.

United States Atomic Energy Commission
Post Office Box E
Oak Ridge, Tennessee

PERMANENT Document
Indefinite retention period
"DO NOT DESTROY"

Subject: Reduction Reactor Explosion
in Building 9206 (u)

Attention: Mr. R. C. Armstrong

Gentlemen:

At approximately 1:20 p.m. on Thursday, March 3, 1955, a reduction reactor in Building 9206 exploded. The lid was blown from the reactor, the furnace housing was demolished and damage was also sustained by the light fixture, hoist and pipe insulation directly above the reactor. The induction coil and the auxiliary electrical equipment were not damaged. The entire reduction batch containing 2,081 grams of uranium at an assay of 37.5% U-235 was blown out into the room in dust form. Only one operator was in the room at the time of the explosion. He was weighing iodine crystals and received minor burns from iodine which was thrown on his face and head by the force of the explosion.

The exact cause of the explosion has not been determined. It is strongly suspected, however, that the presence of moisture and impurities in the UF_4 were the primary cause. It is possible that the bolts holding the reactor lid were over stressed, but this cannot be verified. The particular batch of UF_4 used in this reduction had been contaminated with an ammoniacal HF neutralizing solution during its manufacture. The contamination resulted from a plugged HF orifice on the conversion furnace during the cooling cycle. This allowed a negative pressure to develop in the furnace, drawing the neutralizing solution back into it. In an effort to reclaim the UF_4 , it was reheated to approximately 400° C in a nitrogen atmosphere for a period of four hours. Though it was realized that the special reduction batch made from this green salt would contain more than the usual amount of metallic impurities, it was assumed that metal of satisfactory purity for blending would be produced.

Since the explosion occurred at the time the reactor reached firing temperature it is probable that the drying described above was not sufficient to drive off other impurities from the neutralizing solution. This solution is known to contain such compounds as ammonium nitrate and ammonium fluorides. These materials should have been decomposed and driven off at 400° C. Considering the force of the explosion, this apparently was not done.

DECLASSIFICATION RECOMMENDED with indicated deletion

Name (ADC) - Organization
EASE

Date
3-28-96

~~SECRET~~

ORO 68139
DECLASSIFICATION AUTHORIZED with deletion
GABRIEL MARCIANTE, ORO CLASSIFICATION OFFICER
NAME (ADD) - ORGANIZATION
DATE
3/29/96

ChemRisk Document No. 2757

9 MCF

~~SECRET~~

2

United States Atomic Energy Commission

March 14, 1955

To prevent the recurrence of a similar explosion, strict orders have been issued to process all UF_4 contaminated with neutralizing solution by wet chemical methods. Work has been underway for some time to replace this present method of neutralizing the HF from the conversion furnaces, and the problem is complicated by the necessity of recovering the small amount of uranium contained in these off-gases. This work is being further expedited as a result of the explosion. Engineering studies are also underway to confirm the structural soundness of these reactors under normal operating conditions.

The recovery of the uranium from this accident will require several weeks. The room and all equipment were thoroughly cleaned and the resulting salvage consisting of combustibles, solids, and so forth, will be processed separately. Since the recovery will take some time, it is not possible to estimate the amount of uranium lost due to the explosion. As soon as this has been done we will inform you of the amount of the loss. An estimate of the monetary losses resulting from the explosion will include approximately \$600 for the repair of the equipment and a sum of the order of \$2,000 for the clean-up and recovery of the uranium.

Yours very truly,

CARBIDE AND CARBON CHEMICALS COMPANY

J. P. Murray

J. P. Murray
Y-12 Plant Superintendent

RFH/bm

Distribution:

Copies 1 - 2: R. C. Armstrong
3: C. E. Center
4: L. B. Emlet
5: G. A. Strasser
6: R. F. Hibbs
7: W. F. Cameron (Y-12 RC)
8: J. P. Murray

~~SECRET~~